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PATENT & TRADEMARK OFFICE

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Application No.	: 10/747,956	Confirmation No.	: 6209
First Named Inventor	: Ulrich SESEKE-KOYRO		
Filed	: December 31, 2003		
TC/A.U.	: 1754		
Examiner	: NGUYEN, NGOC YEN M		
Docket No.	: 037110.51540D1		
Customer No.	: 23911		
Title	: Alkali Metal Fluorozincate and The Production Thereof		

APPEAL BRIEF

Mail Stop Appeal Brief – Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

Sir:

Pursuant to the Notice Of Appeal filed September 1, 2005, the period for taking action having been extended to December 1, 2005 by the attached Petition for Extension of Time, Applicants herewith submit their Appeal Brief in accordance with the provisions of 37 C.F.R. § 1.192. This Appeal Brief is accompanied by a check in the amount of $500.00 in payment of the required appeal fee under 37 C.F.R. § 1.17(c). This amount is believed to be correct, however, the Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, to Deposit Account No. 05-1323, Docket No.: 037110.51540D1.

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I. REAL PARTY IN INTEREST (37 C.F.R. § 1.192(c)(1))

The real party in interest is Solvay Fluor und Derivate GmbH, Hans-Boeckler-Allee 20, 30173 Hannover, Germany, a German company, by virtue of an assignment recorded at Reel 013629, Frame 0450.

II. RELATED APPEALS AND INTERFERENCES (37 C.F.R. § 1.192(c)(2))

Applicants are not aware of any interferences or other appeals that would affect, be affected by, or have a bearing on a decision in this appeal.

III. STATUS OF CLAIMS (37 C.F.R. § 1.192(c)(3))

Claims 1-7 were canceled. Claims 13-17 stand withdrawn from consideration. By this Appeal, Appellants seek review of the final rejection of Claims 8-12 on prior art grounds. An Appendix containing a copy of pending Claims 8-12 is attached.

IV. STATUS OF AMENDMENTS (37 C.F.R. § 1.192(c)(4))

There are no unentered amendments in the application.

V. SUMMARY OF THE INVENTION (37 C.F.R. § 1.192(c)(5))

Alkali metal fluorozincates can be used as fluxing agents for brazing components made of aluminum or alloys of aluminum. Applicants' invention relates to alkali metal fluorozincates produced by reacting zinc oxide, an alkali metal hydroxide, and an alkali metal fluoride or hydrogen fluoride in an aqueous phase. A preferred alkali metal is potassium. The invention enables alkali metal fluorozincates having a desired particle size and particle size distribution to be prepared *in situ* (i.e., as a direct product of their synthesis, without the need for additional particle size manipulation) by selecting (1) the starting compounds used to form the particles and (2) the sequence in which the starting compounds are reacted with one another. By controlling the particle size

distribution, which can be characterized as fine, medium-fine or coarse, the suitability for particular brazing processes can be enhanced.

Fine alkali metal fluorozincates have a particle size distribution in which 50% of the particles have a diameter of less than 5 micrometers. Medium-fine alkali metal fluorozincates have a particle size distribution in which 50% of the particles have a diameter of less than 11 micrometers. Coarse alkali metal fluorozincates have a particle size distribution in which 50% of the particles have a diameter of greater than 11 micrometers. The fine product is particularly suitable for wet fluxing applications, and the coarse product is particularly suitable for dry fluxing applications. The medium-fine product is suitable for both wet and dry fluxing applications.

Applicants have discovered that fine alkali metal fluorozincate can be produced by mixing zinc oxide and an alkali metal hydroxide into a suspension, and then adding hydrogen fluoride to the suspension. Medium-fine alkali metal fluorozincate can be produced by mixing zinc oxide and hydrogen fluoride, and then adding a metal hydroxide to the mixture. Coarse alkali metal fluorozincate can be produced by mixing zinc oxide and hydrogen fluoride, and then adding an alkali metal fluoride to the mixture.

Independent Claim 8 relates to fine alkali metal fluorozincate that is produced by first mixing zinc oxide and an alkali metal hydroxide into suspension, and then adding hydrogen fluoride to the suspension (paragraph [0010] of the specification). Dependent Claim 9 requires the use of potassium

fluorozincate as the alkali metal fluorozincate (paragraph [0017]). Dependent Claim 10 is directed to a fine alkali metal fluorozincate which has a grain spectrum in which 50% of all particles have a diameter less than 3.8 micrometers (paragraph [0012]). Applicants have surprisingly discovered that the fine alkali metal fluorozincate of Claim 8 is finer than the product produced by previously known methods (paragraph [0016]).

Independent Claim 11 relates to medium-fine alkali metal fluorozincate produced by first mixing zinc oxide and hydrogen fluoride, and then adding a metal hydroxide to the mixture (paragraph [0010]).

Independent Claim 12 relates to coarse alkali metal fluorozincate produced by first mixing zinc oxide and hydrogen fluoride, and then adding an alkali metal fluoride to the mixture (paragraph [0010]).

VI. ISSUES (37 C.F.R. § 1.192(c)(6))

The following grounds of rejection are on appeal:

1. Whether Claims 8-11 are obvious over either Seseke-Koyro et al. (PCT Publication No. WO99/48641, which is equivalent to U.S. Patent No. 6,432,221) or Lauzon et al. (U.S. Patent No. 6,015,850) in view of Popoola et al. (U.S. Patent No. 5,723,187)?

2. Whether Claim 12 is obvious over either Seseke-Koyro et al. or Lauzon et al. in view of Shimajiri et al. (U.S. Patent No. 4,989,775)?

VII. GROUPING OF THE CLAIMS (37 C.F.R. § 1.192(c)(7))

The claims of the present application do not all stand or fall together and should each be considered independently as explained in the Argument section below. Claim 9 stands or falls together with Claim 8, but Claims 8, 10, 11 and 12, which specifically recite alkali metal fluorozincates having a particular grain size distribution, are independently patentable.

VIII. ARGUMENT (37 C.F.R. § 1.192(c)(8))

Claims 8-11 were rejected under 35 U.S.C. § 103(a) as allegedly obvious over the combination of disclosures in either Seseke-Koyro or Lauzon as combined with Popoola. Independent Claim 12 was rejected under 35 U.S.C. § 103(a) as allegedly obvious over the combination of disclosures in either Seseke-Koyro or Lauzon as combined with Shimajiri. These rejections are respectfully traversed for the following reasons.

In order to establish a case of *prima facie* obviousness with respect to claimed subject matter, the Patent Office must establish (1) "some suggestion or motivation in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to ... combine the reference teachings"; (2) "a reasonable expectation of success"; **and** that (3) "the prior art ... references when combined ... teach or suggest all the claim limitations." "The teaching or suggestion to make the claimed combination and the reasonable expectation of success must both be found in the prior art, not in applicant's disclosure" (*In re Vaeck*, 947 F.2d 488, 20 USPQ2d 1438 (Fed. Cir. 1991)). See MPEP §2143 and MPEP §2143.03.

1. Claims 8-12 are Patentable Because The Primary and Secondary References Relate to Distinctly Different Materials and There is No Suggestion or Motivation to Combine these References

It would not have been obvious to combine the secondary references of Popoola or Shimajiri with either Seseke-Koyro or Lauzon. Seseke-Koyro and Lauzon each relate to potassium fluorozincate salts. Popoola discloses potassium aluminum fluoride salts and **not** alkali metal fluorozincate salts. Further, Shimajiri discloses complexes or mixtures of potassium fluoride (KF) and aluminum fluoride (AlF_3) and **not** alkali metal fluorozincate salts. Pointedly, the fluorozincate salts of Seseke-Koyro and Lauzon are distinctly different from the aluminum-containing salts of Popoola and Shimajiri.

As explained at MPEP § 2143.01:

> The mere fact that references can be combined or modified does not render the resultant combination obvious unless the prior art also suggests the desirability of the combination. *In re Mills*, 916 F.2d 680, 16 USPQ2d 1430 (Fed. Cir. 1990).

As stated by the Court of Appeals for the Federal Circuit in *In re Kotzab*, 55 USPQ2d 1313, 1316 (Fed. Cir. 2000):

> Most if not all inventions arise from a combination of old elements. See *In re Rouffet*, 149 F.3d 1350, 1357, 47 USPQ2d 1453, 1457 (Fed. Cir. 1998). Thus, every element of a claimed invention may often be found in the prior art. See *Id.* However, identification in the prior art of each individual part claimed is insufficient to defeat patentability of the whole claimed invention. See *Id.* Rather, to establish obviousness based on a combination of the elements disclosed in the prior art, there must be some motivation, suggestion or teaching of the desirability of making the specific combination that was made by the applicant (emphasis added).

The rejections each fail to set forth a tenable basis as to why one skilled in the art would have applied the teachings of the aluminum-based fluoride salts of Popoola or Shimajiri to the claimed alkali metal fluorozincate salts. Moreover, there is no reason to think that a desired particle size of the aluminum-based salts of Popoola or Shimajiri would be relevant to a desired particle size for the claimed alkali metal fluorozincate salts.

Because the materials disclosed in the secondary references of Popoola and Shimajiri are materially different from the materials disclosed in the primary references of Seseke-Koyro and Lauzon, and because there is no motivation to apply the grain size of one chemical substance to a different chemical substance, the combination of these references is improper and the rejections should be reversed.

2. Claims 8-12 are Patentable Because There is No Reasonable Expectation that the Proposed Modification Would be Successful

It is well established that the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success. *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). However, the absence of a reasonable expectation of success may support a conclusion of non-obviousness. *In re Rinehart*, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976).

In the present case, the primary references disclose potassium fluorozincate fluxes, but the secondary references each relate to a completely

different material. Seseke-Koyro and Lauzon relate to potassium fluorozincate salts, while Popoola and Shimajiri relate to aluminum-containing fluoride salts. There is nothing in the record to suggest that the teachings of Popoola and/or Shimajiri relating to aluminum-containing salts could be successfully applied to the different fluorozincate materials of the primary references. On this record, one could not have had a reasonable expectation of successfully forming alkali metal fluorozincate salts having the claimed particle size distributions even if Popoola or Shimajiri were combined with Seseke-Koyro or Lauzon. Accordingly, the obviousness rejections should be reversed.

3. There is No Basis to Incorporate the Particle Size of the Aluminum-Based Materials of Popoola into the Materials of Seseke-Koyro or Lauzon.

As acknowledged in the Official Action, Seseke-Koyro and Lauzon fail to disclose any particle size for alkali metal fluorozincate salts. In the rejection of Claims 8-11, the Office Action cites Popoola for teaching that a potassium aluminum fluoride salt can have a particle size of less than 10 micrometers. According to Popoola, by controlling the particle size of the potassium aluminum fluoride salt, the potassium aluminum fluoride particles can remain in solution without the need for stirring.

First, as discussed above, there is no reason to believe that the teachings related to the potassium aluminum fluoride salts of Popoola would even be applicable to the potassium fluorozincate salts disclosed by Seseke-Koyro and Lauzon. Popoola discloses a distinctly different chemical substance than the

potassium fluorozincate disclosed by Seseke-Koyro and Lauzon. There is no basis to modify one material based on a preferred property of a completely different material.

Second, the Office Action alleges that it would have been obvious to obtain the potassium fluorozincate of either Seseke-Koyro or Lauzon with a particle size of less than 10 micrometers as suggested by Popoola "by optimizing the conditions of the process of making such product." However, each of the cited references and the Office Action are silent as to which process conditions to select for optimization, much less how any process conditions might affect particle size. Popoola merely discloses that the particle size of a double fluoride salt can be controlled. Popoola is completely silent as to how such control might be achieved.

Before the determination of the optimum or workable ranges of a variable might be characterized as routine experimentation, that variable must first be recognized as a result-effective variable, i.e., a variable which achieves a recognized result. *In re Antonie*, 559 F.2d 618, 195 USPQ 6 (CCPA 1977). In the instant case, each of the cited prior art references fails to recognize that the sequence by which reactants are combined can affect particle size of the product. Absent such recognition, there is no basis by which the processes of either Seseke-Koyro or Lauzon can be optimized to produce the claimed alkali metal fluorozincates.

Finally, the Official Action also alleges that it would have been obvious to obtain the potassium fluorozincate of either Seseke-Koyro or Lauzon with a particle size of less than 10 micrometers as suggested by Popoola "by pulverizing if the product particles are too big or agglomerating if the product particles are too small."

As discussed above, Applicants have unexpectedly discovered that alkali metal fluorozincate salts having a desired particle size can be prepared by drying the product of an aqueous reaction without the need for additional processing (i.e., without pulverizing). The particle size and the particle size distribution of alkali metal fluorozincates can be controlled during the synthesis of the particles by selecting the reagents used to form the particles and controlling the order in which the reagents are combined. In order to attain the desired particle size distribution, no additional processing is required. Because there is no basis to modify the processes of Seseke-Koyro or Lauzon to produce the claimed particle sizes, the rejection should be reversed.

A. Claims 8 and 9 are independently patentable because the cited references fail to teach or suggest an alkali metal fluorozincate wherein the particles have a diameter of less than 5 micrometers.

Applicants have discovered that a particular group of reagents, when combined in a particular order, produce alkali metal fluorozincate particles having a desired particle size distribution. In particular, Claim 8 recites alkali metal fluorozincate particles having a grain spectrum in which 50% of the

particles have a diameter of less than 5 micrometers. None of the cited references recognize that starting reagents when combined in a specified order produce alkali metal fluorozincate particles having a desired particle size distribution, much less the particle size distribution claimed in Claim 8. Moreover, none of the cited references disclose or suggest potassium fluorozincate particles having a diameter of less than 5 micrometers. By combining starting reagents in the order set forth in Claim 8, Applicants have surprisingly discovered that the fine alkali metal fluorozincate of Claim 8 is finer than the product produced by previously known methods. Accordingly, independent Claim 8 is deemed patentable and the rejection of Claims 8-9 should be reversed.

B. Claim 10 is independently patentable because the cited references fail to teach or suggest an alkali metal fluorozincate wherein 50% of the particles have a diameter of less than 3.8 micrometers.

Claim 10, in pertinent part, recites alkali metal fluorozincate particles having a grain spectrum in which 50% of the particles have a diameter of less than 3.8 micrometers. As noted above, Applicants have surprisingly discovered that the fine alkali metal fluorozincates are finer than the product produced by previously known methods. Because none of the cited references disclose alkali metal fluorozincate particles having such a fine particle size or recognize that reagents used to produce alkali metal fluorozincate can be combined in a

specified order to produce such a fine particle size distribution, the rejection of Claim 10 should be reversed.

C. Independent Claim 11 is independently patentable because the cited references fail to teach or suggest an alkali metal fluorozincate wherein 50% of the particles have a diameter of less than 11 micrometers.

Claim 11 requires alkali metal fluorozincate particles having a grain spectrum in which 50% of all particles have a diameter less than 11 micrometers. None of the cited references recognize that particular reagents used to produce alkali metal fluorozincate particles can be combined in an order so as to produce alkali metal fluorozincate particles having the claimed particle size distribution. Because none of the cited references disclose or suggest alkali metal fluorozincate particles having a grain spectrum in which 50% of the particles have a diameter of less than 11 micrometers, the rejection of Claim 11 should be reversed.

D. Independent Claim 12 is independently patentable because the cited references fail to teach or suggest an alkali metal fluorozincate wherein 50% of the particles have a diameter of greater than 11 micrometers.

As discussed above, Applicants have discovered that potassium fluorozincate particles having a desired particle size distribution can be obtained by controlling the order in which reagents used to form the particles are combined. In particular, as recited in Claim 12, alkali metal fluorozincate particles have a grain spectrum in which 50% of the particles have a diameter of

greater than 11 micrometers. Because none of the references teach or suggest an alkali metal fluorozincate having such a grain spectrum, the rejection of Claim 12 should be reversed.

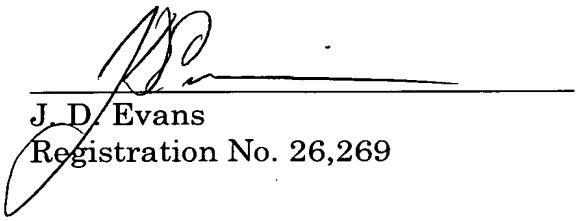
Summary and Conclusion

Both of the rejections under 35 U.S.C. § 103 require one of skill in the art to assume that teachings relevant to an aluminum-based fluoride flux would be applicable to an alkali metal fluorozincate flux. Absent some suggestion that the characteristics of materials of one composition are specifically applicable to materials having a completely different composition, there is no motivation to combine the teachings of Popoola and Shimajiri with those of Seseke-Koyro and Lauzon. Further, insomuch as both Seseke-Koyro and Lauzon relate to potassium fluorozincate salts and Popoola and Shimajiri relate to aluminum-based salts, one could not have had a reasonable expectation of successfully forming the claimed alkali metal fluorozincates based on a combination of these references. Finally, even if combined, because the references fail to teach or suggest alkali metal fluorozincates having the claimed particle size distributions, the obviousness rejections cannot be properly maintained. There is absolutely no recognition in any of the cited references that the order in which reagents are combined can be used to control the particle size distribution of alkali metal fluorozincate salts. Further, none of the references disclose or suggest alkali metal fluorozincate particles having the claimed particle size distributions.

Appellants respectfully submit that independent Claims 8, 11 and 12, as well as Claims 9-10 which depend from Claim 8, are patentable over the cited art. Appellants therefore request that the Board reverse the Final Rejections of these claims.

Respectfully submitted,

December 1, 2005



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Claims Appendix

8. A fine alkali metal fluorozincate produced by reacting alkali metal hydroxide, zinc oxide, and alkali metal fluoride or hydrogen fluoride in aqueous phase, wherein alkali metal hydroxide and zinc oxide are mixed into a suspension and hydrogen fluoride is added, said fine alkali metal fluorozincate having a grain spectrum in which 50% of all particles have a diameter < 5 μm.

9. An alkali metal fluorozincate according to claim 8, wherein the alkali metal is potassium.

10. A potassium fluorozincate according to claim 9, having a grain spectrum in which 50% of all particles have a diameter < 3.8 μm.

11. A medium fine alkali metal fluorozincate produced by reacting alkali metal hydroxide, zinc oxide, and alkali metal fluoride or hydrogen fluoride in aqueous phase, wherein hydrogen fluoride and zinc oxide are mixed with one another and alkali metal hydroxide is added, said medium fine alkali metal fluorozincate having a grain spectrum in which 50% of all particles have a diameter < 11 μm.

12. A coarse alkali metal fluorozincate produced by reacting alkali metal hydroxide, zinc oxide, and alkali metal fluoride or hydrogen fluoride in aqueous phase, wherein hydrogen fluoride and zinc oxide are mixed with one another and alkali metal fluoride is added, said coarse alkali metal fluorozincate having a grain spectrum in which 50% of all particles have a diameter > 11 μm.